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OCTOBER 14 1891

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Garden and Forest.

Among the contents of next week's issue (No. 191) will be the following articles:

Forest-Reservations.
Editorial.

Seedling Almonds in California. (Illustrated.)
By Charles Howard Shinn.

New Orchids.
By R. A. Rolfe.

A Clematis Borer. (Illustrated.)
By J. G. Jack.

The paper will contain an illustration of an Almond-branch in fruit, from a photograph, and a figure of Acalthoë caudata, from a drawing by Mr. C. E. Faxon.

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Report of the New York Forest Commission.

THE fifth annual report of the Forest Commission of the State of New York contains much interesting information, and is full of encouragement for the future in the indication it gives of increased intelligence and a greater interest in the forests of the state than prevailed in this community at the time when the present Commission came into existence. When it is remembered how feebly the public pulse beat ten years ago for the safety of the North Woods, and how great the opposition from the inhabitants of the northern counties was to every serious attempt made for their care and protection, the present feeling of the community must be a source of gratification to the men, very few in number then, who believed that there was no better piece of work to be done than to save this wild region for the benefit for all time of the people of New York. Something certainly has been accomplished; not very much, perhaps, when one remembers the great gashes which have been made in the wilderness during these last years, but a step forward has been taken, and the fact that the Commission is able to report that, through the rules and regulations it has made and enforced, fires, always the greatest menace to the forests of this country, where climatic conditions and forest-composition specially favor their spread, have decreased to a very marked degree. Even more encouraging than the diminution of fires in the Adirondack woods is the smaller number of willful trespassers on the state lands. People are learning at last to respect the forest as property which cannot be entered and despoiled with impunity, and the purchasers of forest-supplies in New York have gradually outgrown that peculiar moral attitude which enabled them to acquire, without any great strain on their consciences, lumber, bark or cord-wood of very uncertain origin. That the Commission, backed by increased public intelligence on the forest-question, has been able to accomplish what it has done already with only a very moderate outlay of money, is certainly hopeful, and seems to indicate that while we are still very far from attaining to the system and perfect methods under which European forest-property is usually managed we are as a people in a better mental condition than we were ten years ago to submit to the restrictions which forest-control must always impose on all inhabitants of forest-regions.

The most important part of the Commissioners' report relates to the proposed Adirondack Park, the possibilities of which they have been studying, their conclusions on the subject, here reproduced, having already been presented to the Assembly in a special report. The proposal of the Commission, stated simply, is that a forest-park shall be created in northern New York to consist of some 2,200,000 acres, to be surrounded by a line not yet actually determined on, but so drawn as to enclose the principal sanitariums and the wildest and most picturesque parts of the region. A portion of the proposed park the state owns already, generally in small and often in widely separated parcels; and a very considerable portion belongs to hunting and fishing clubs, which of late years have been buying up large tracts of the wilderness. Other parts belong to hotels and sanitariums, and the remainder, and probably the largest part, to individuals or firms, who hold the land for the value of timber growing on it. The community is fully alive to the necessity of the state's securing such a park or reservation or public forest, to use what is perhaps the most appropriate name for it, and the public is now so generally in accord with the views of the Commission as to the necessity of such a reservation that it is needless to discuss, at this time at least, the merits of the measure. But the Commission finds itself when the question of methods is reached in serious difficulties. It feels that if it recommends that the state exercise its right of eminent domain and take possession of all the land within the boundaries of the proposed park, the plan would create so much opposition from interested parties that the whole scheme would be defeated; on the other hand, the state is unable to purchase the land at anything like a fair price, as much of it is held by persons who do not want to sell at all, or by men who have bought their holdings in the hope of selling it, at some time or other, to the state at a greatly increased price. The land now held by the state has been principally acquired at tax-sales, but all Adirondack lands have now become so valuable that the time has certainly passed when the state will be able to add to its holdings in this manner.

The Commission has hit upon a compromise measure by which it is hoped that the forest-reservation can be secured through arrangements made with the individual owners, under which these will agree to manage their land in such a way that the community will obtain substantially the same advantages that it would if the title to all the lands rested in the state itself. The plan seems to us to be a bad one. A great state forest, such as is needed to accomplish what is expected of the Adirondack forest, cannot be established on a really stable and permanent basis until the state itself holds the fee to every foot of land within its boundaries. What security can private owners give that they will preserve the natural conditions of the forest beyond the time when it would be for their individual interest to destroy these conditions? What is to prevent the sporting clubs from selling their land by and by to men who will buy it simply for what they can make out of it? What restrictions can be put by the state on the cutting of timber from land belonging to individuals which can be enforced for all time? Can railroads be excluded from land belonging to individuals if it is for their interest to have them built that their timber can be sent to market? The whole question is not a very different one, except in its magnitude, from that presented in the establishment of a city park. What, for example, would have been the probable consequences if some of the owners of the land which is occupied by the Central Park, in this city, had been allowed to retain the fee to their land? What sort of a park would it

have been if men, without reference to the needs or the good of the public, had been able to build a hotel or a trotting-track or a block of stores in the midst of it?

No; there is but one way to proceed if the state of New York needs a great forest-park to preserve the flow of its rivers and to afford its people for all time the opportunity to enjoy the beauties and advantages which a communion with nature always brings to the human race, and that is to take the land. It is not easy to imagine a case where the right of eminent domain could be more wisely enforced, or where the individual suffering would be smaller in comparison with the benefits bestowed upon the public at large by the taking. Bricks cannot be made without straw. A public forest in this state, covering 2,000,000 acres, and 3,000,000 would be much better, would involve a large immediate outlay, perhaps twenty millions of dollars, probably more rather than less. It might have been had ten years ago for half the money; in ten years from now it will cost twice as much, and the necessity of the reservation will be incomparably greater. But even a larger sum than twenty millions of dollars will be well invested in securing such a reservation which can be made to pay at once a fair return for the investment. A large part of the land, once the fee is secured, can be leased to the clubs and to the lumbermen on long leases, with proper restrictions as to the cutting of timber. The hotel sites and the sanitariums can be leased to the original owners if they care to continue in the business. These rentals and the sale of timber—for any sensible management of the woods means the cutting of all ripe trees under some well-considered system—the fishing and hunting rights and other sources of income would, almost from the very beginning, pay the interest on the cost of the investment, and in the future, as forest-property becomes more valuable, the operation should show a handsome profit.

Money expended on a state reservation which the state does not control is money thrown away, for it will not accomplish any good results, but the money spent in acquiring a fee to the land is money well spent, as it will bring health and prosperity to the whole state. There will be serious opposition to such a scheme on the part of many interested men, but the people in the end would favor it; and there can be no doubt that in time the measure can be successfully carried out if it is advocated intelligently and persistently.

New England Parks.

THE LYNN WOODS.

THE distinctive character of this stately park of sixteen hundred broad acres is well indicated by its name. Here are no smooth lawn expanses, no manufactured terraces, no artfully artless shrubberies, no mall, no playgrounds of skillful fashioning, but, in their stead, gigantic boulders, deep ravines, and rocky summits, and everywhere the unending forest, where one can dream of Sherwood and the merry outlaw Robin Hood. One is half-tempted to wind a bugle in these wilds to see if the men in Lincoln green might not come dashing through the bracken at the call, and behind the boles of the great trees one fancies he may catch a glimpse of Little John, or the burly figure of Friar Tuck.

From the founding of the settlement in 1629 these woods of Lynn were held as commons by its farmers, but only of late years, thanks to the public spirit of some of her citizens, has the property been legally acquired by the town, to be held perpetually as a pleasure-ground for its people.

When the plucky race that dared to settle Massachusetts first took possession of this part of the country, they found a strip of level fertile land, lying near the sea, which received the wash of a line of wooded stony hills, a part of the picturesque low range that extends along the shore, from Cape Ann to the well-defined summits of the Blue Hills of Milton. Here were good arable fields, and they accordingly selected it for their homesteads, reserving the heights behind as a common pasture for their animals.

These commons the farmers divided by long walls, built by their combined labor, and they still retain their ancient names. The Cow-pasture was the part nearest the town, that the milky mothers of the herd might easily be reached for domestic purposes. The more remote and hilly section was the Horse-pasture, where the mares and colts, and horses not in use, could pick up an inexpensive living; and a third division, across the swamp which drained the hills, bears to this day the title of Ox-pasture.

This whole region, now, all but the last, included in the park, is thickly wooded with good-sized trees, mostly Oaks, Maples and Walnuts, interspersed with some Pines and Hemlocks of great size. Black Birches and Ash-trees are also found, and here and there some Beeches. The wide marshes that separated Ox-pasture from the others have been transformed into a chain of lakes, two miles in extent, along and across which the parkways wind, while the water, now limpid and sweet, serves to supply the growing city.

The margins of these roads by the water-side, unnecessarily stripped by the engineers of the water-works of all their trees and shrubs on one side, are struggling to renew their growth, and if the Park Commissioners will put in a few Willows here and there for quick effect, bountiful nature will in a few years repair the ravages of man, and restore the lovely green screen between the road and the water, which is very essential to the beauty of the drive. Picturesque glens border this parkway, on the uncut side, with a charming undergrowth of shrubs and ferns, and fine tall trees climbing the stony heights.

Under the guidance of an enthusiastic lover of the forest, who has done much for the park, we wandered through the woods along a cart-path, outlined in soft green ferns close set as turf, until in the heart of the woods we came upon a curious reminiscence of the old settlers, the wolf-pits—two grave-like excavations, lined with stone like a well, some six feet in length by three feet wide, and originally more than nine feet deep. These holes, covered carefully with brush and sprinkled with bait, attracted the unwary wolf, who could be easily destroyed by the trapper. Tradition tells of one of the forefathers coming upon an unexpected find when he drew his traps of a morning, for there, in one corner of the deep pit, sat a cowering squaw, glared at by a terrified wolf at the opposite end, each too alarmed to approach the other.

Within the park itself are curious formations of stone; great rocks with caverns beneath them, one of which is known as Dungeon Rock. The name implies a tradition, but none has survived to fit it with a legend. The nearest approach to one is the story of the spiritualists, who here held their meetings and performed uncanny rights, excavating the rocks under the direction of their familiars, and producing strange relics which were supposed to be found beneath them. Here they built odd circular dwellings of stone, miniature towers, that will, when overgrown with Ivy, prove effective as ruins. One of their leading prophets is buried here, at the foot of the rocks, in a grave surrounded with a pointed battlement of stones, and on the leaf-strewn earth within lay some fresh flowers, showing the recent visit of some disciple to this lonely spot.

Another picturesque feature of the woods is the ravines hung with ferns and bushes, one of which is over two hundred feet in depth; but what pleased me best of all were the four rocky hill-tops rising so high above the trees that the view over the surrounding country is unobstructed. From one of these the beholder receives an extraordinary impression of the extent of the woods which surround him.

This park is the largest in the country except Fairmount Park, Philadelphia, but even the knowledge of its numerous acres does not prepare one for the effect of unbroken forest he receives when he climbs this summit and looks off upon the landscape bounded by the sea and the far-distant mountains of New Hampshire. Ten miles away the glittering dome of Boston catches the eye above its misty group of spires and chimneys, and on the other side Marblehead Light can be viewed, out on its rocky point in the north, Chicorua and Monadnock raise their giant heads above the low-lying clouds, and hill upon hill bounds the horizon, but Lynn has disappeared. Trackless woods seem to encircle the spot. No houses or spires are visible near at hand. What seem to be miles of trees lie below in varying shades of green, over soft undulations which tell of alternations of hill and dale, ravine and boulder, but all that speaks of the busy town somewhere near by has melted into the wilderness. Between Mount Gilead and Shawmut are seen only the tree-tops and the gray line of water where the coast curves.

Such a sight, lacking the dome and spires, may have met the eye of the early settler when he first climbed his way through the forest to this bald hill-top. A far-away sympathy with that lonely pioneer seizes you as you gaze. How desolate, how unconquerable must have seemed that waste of woodland, even to his dauntless spirit, strong to combat with virgin

nature. To-day, again, one feels the power of the encroaching forest; of the littleness of man against the eternal forces. Let him pause an instant and he is swept from the face of the earth; his proudest home a ruin, over which the wild vine clambers; his once stirring town a prey to the readvancing wilderness. Such sights, I am told, are to be seen in the far west, where the embryo town, deserted, relapses into desolation. A strange fear came upon me as I looked. We who preserve forests do we not cherish a foe in this great blessing? The lonely terror of the great woods came upon me, and in thought I saw this busy region once more a waste; all this bustling, nervous life stilled; our civilization an overgrown wreck; an Oak-forest where the State-house stands; a group of Pines on Marblehead Neck.

Climbing another of these hills I was reassured. There sat Lynn upon the shore as large as life, with the chimneys of its manufactories belching smoke, its railroads teeming with traffic, its harbor white with sails. Other towns came into view from other elevations—Peabody and Salem, only three miles distant from the park's eastern gate; distant Danvers among its Elms, and Wakefield, Malden, Everett and Chelsea, all within easy driving distance, on the west, while electric cars, packed with people, were bringing throngs for rest and solace to the wild solitudes of the great woods.

Then came to me a new sense of pride in our people, who in the midst of their struggle for a living, with all their greed of gain thick upon them, find time to think of their children and to plan an everlasting pleasure for the future citizens. This friendliness of spirit is more fine even than the forest which it cherishes, and one honors the men who conceive this idea and labor to confer this boon upon their neighborhood.

The moving spirit in acquiring this park for Lynn was Mr. C. M. Tracy, whose zeal and example induced many citizens to join in purchasing the land which was a nucleus for future acquisitions. Later, like all great enterprises, it outgrew its founders, and the town itself had to come in with its right of eminent domain, and add more and more to the reservation. Lovers of nature and the people, like Mr. P. A. Chase, have bought other forest-lands to protect it and ultimately increase the noble dimensions of the park, and so the good work goes on.

A fine grove of noble Hemlocks was rescued from the very axe of the headsman by Mr. Chase, and forms one of the most beautiful ornaments of the park, the trees being of great size, with a stony brook flowing between the hills on which they grow. Cardinal-flowers bloom, and great Ferns wave beside this murmuring stream, and the sunlight sifts in among the branches, and makes of it an enchanted grove, from which there is an outlook upon one of the four ponds that add so much to the charm of this region of rock and woodland.

I have not spoken of the beauty of the drives, which, following the lines of the old cart-paths, wind in graceful curves all through the forest, nor of the wild paths that lead by short cuts to Dungeon Rock and to the look-outs from the hill-tops, as well as to interesting vistas and places of interest. It was a pleasant sight to see car-loads of people hurrying to the woods for change of scene, and to hear the echo of glad children's voices and to see the look of enjoyment in the tired faces of pale mothers who had escaped hither from the town.

The scheme of the park includes places of recreation for young and old. The drained marsh in winter will be excellent for skating. There are to be ball-grounds and tennis-courts, and conveniencies for picnics, rough tables and seats being already provided for the last in an appropriate place. It is the People's Palace, where they can take continual delight, and to which not only the inhabitants of Lynn can resort, but those of seven neighboring towns, none of which are more than three miles from its various entrance-gates. This great domain is the magnificent gift of a generous people to the Commonwealth, and well may the citizens of Lynn take pride in so princely a possession.

Our "great, avaricious, sensual America," that Emerson talks of, has a warm heart beating in her young breast, and a generous hand to give. Never is the cry of the needy unheard by her, and to her children she gives royally and wisely.

This noble public spirit in our people, this large-hearted, open-handed bestowing, is a splendid sign for the future. If these things are done in the green tree, what shall be done in the dry? If now, in the hot impatience of hungry youth, our citizens still plan for the future of their neighborhoods, how much the more, as the country matures, will these gifts increase, as, fired by the great examples of their ancestors, the future sons of the Republic lay the foundations of long-enduring benefactions, none, however, to be more precious to the people than the great and beautiful woods of Lynn.

Hingham, Mass. *M. C. Robbins.*

Filices Mexicanæ.—II.

We now continue the enumeration of the Ferns collected during the seasons of 1888, 1889 and 1890, by Mr. C. G. Pringle, of Charlotte, Vermont, in the states of Nuevo Leon, Jalisco, San Louis Potosí and Machoacan, Mexico. We are indebted to Mr. George E. Davenport, of Medford, Massachusetts, for the list, together with notes and descriptions of new species and varieties. The numbers used correspond with those on Mr. Pringle's tickets which accompany his distribution.

Asplenium pumilum, Swz. (2583). Shaded damp banks of Barranca, September, 1889; also 2028, same locality, December, 1888. This is undoubtedly true *pumilum*, and very distinct from Pringle's 1444 of his 1887 collection, which was referred to this species with some hesitation in "Fern Notes," X., in *Bulletin of the Torrey Botanical Club*, vol. xv., p. 226, and which will now have to be otherwise disposed of. Professor Eaton suggests that it may be a very dwarf form of *A. Mexicanum*, Mart. & Gal., now *A. fragrans*, or a possible hybrid between that species and *A. pumilum*. But whether those species grew in the same locality, or near by, where it was collected, or not, I do not know, as my own specimens of all three Ferns were collected in different localities far apart. It is, however, unlike any form of *A. fragrans* that I have seen, and, as it is left in so unsatisfactory a condition of determination, I venture, as a possible solution, to give to it the provisional name of *A. dubiosum*, in recognition of its present uncertain character, and submit the following brief diagnosis:

Asplenium dubiosum (1444). Collection of 1887, *n. sp.* Stipites tufted, 1′ to 2′ long, brown, naked; laminæ 1′ to 2′ long, ¾′ to 1¼′ broad at base, varying from oblong-lanceolate to deltoid-ovate or triangular, pinnately divided into from two to four pairs of wedge-shaped ovate or obliquely ovate pinnæ, lower ones the largest; upper portion sinuately pinnatifid, with obliquely obovate or cuneate dentate divisions, to the apex; lowermost pinnæ deeply cleft into one or two pairs of obliquely obovate or wedge-shaped toothed divisions at the base, and sharply dentate to the apices; texture coriaceous; main rachis green, channeled along the face and extending downward on to the stipes; sori oblique, becoming confluent when mature.

Habitat: Ledges, Arroyo, Aucho, Sierra Madre, state of Chihuahua, October 15th, 1887. Resembles *A. pumilum* in the shape of its fronds, but with the evergreen texture of *A. montanum*, and more sharply toothed divisions.

Asplenium Shepherdi, Spreng. (2025). Under wet cliffs near Guadalajara, December, 1888. A form which appears to me to be var. *inequilaterum*, Baker.

Asplenium Trichomanes, L., var. *repens*, Davenport (1838). Moist banks near Guadalajara, November, 1888.

Botrychium Virginianum, Swartz (3408). Wooded hills of Patzcuaro, October, 1890.

Blechnum occidentale, L. (1870). Springy banks near Guadalajara, November, 1888.

Cheilanthes Cooperæ, D. C. Eaton (1863). Shady mossy ledges or rocky banks, in damp places, chiefly in the Barranca and its branch cañons, November, 1888.

Cheilanthes gracillima, D. C. Eaton (2037). Dry ledges of Sierra Madre. Altitude 8,500 feet, October, 1888.

Cheilanthes lendigera, Swartz (3368). Dry ledges, hills of Patzcuaro, November, 1890. Specimens large and beautiful.

Cheilanthes meifolia, D. C. Eaton (1987). Northern slope of the Sierra Madre, near Monterey, abundant on cool, shady, often rocky, steep banks of gulches and ravines, June, 1888.

Cheilanthes microphylla, Swartz (1988). With broadly deltoid or triangular-ovate fronds, from limestone gulches and shady banks of mountains east of Monterey; and (1989) with tall and narrow fronds from partially shaded banks of dry gulches in cool, shady cañons, foot-hills of the Monterey, Sierra Madre, June, 1888; also 2024, from near Guadalajara, December, 1888, a very pubescent form, with broadly oblong fronds. The three forms are distinct enough in appearance for different species, but I can find no good characters by which to separate them even as varieties.

Cheilanthes Palmeri, D. C. Eaton (2584). Shaded ledges, near Guadalajara, September, 1889.

Cheilanthes tomentosa, Link (2603). Near Guadalajara, 1889, a rather lax form, with but slight pubescence.

Cheilanthes viscosa, Link (1842). Moist banks, near Guadalajara, November, 1888, large and fine.

Dicksonia rubiginosa, Kaulf (3407). Rich ravines, Tamasopo Cañon, June, 1890.

Gymnogramme pedata, Kaulf (1861). Damp shady banks, near Guadalajara, November, 1888; common in the Barranca and trenches.

Gymnogramme pilosa, Mart. & Gall. (2589). Wet rocks, near Guadalajara, November, 1889.

Gymnogramme tartarea, Desr. (1862). About the wet bases of sand-walls in gullies near brooks and springs, 1888.

Hemionitis elegans, *n. sp.* (2585). Root-stock, short, stout, ascending, crowns clothed with coarse pale brown scales; fronds 6′ to 16′ tall; stipites 3′ to 7½′ long, dark chestnut brown, polished, deciduously scaly at the base, naked above; laminæ 5′ to 9′ long, 4′ to 10′ broad, broadly deltoid-ovate, sinuously lobed at the base and palmately cleft into from 3, in the smaller, sterile, to 5, in the larger, fertile fronds, long acuminate divisions, the lower pair spreading and somewhat auricled at the base; texture, herbaceous; color, dark green; fructification confined to and following the course of the beautifully reticulated venation over the entire under-surface. Whole plant smooth.

Habitat: Shaded banks and ledges of the Barranca, near Guadalajara, September 24th, 1889. A very striking and handsome Fern, which takes its place at once as the most imposing member of a small genus which is confined almost exclusively to the tropics. It bears some resemblance to the next, but is from two to three times as large, and Mr. Pringle is to be congratulated on having made so fine a discovery. The figure opposite is from a drawing by Mr. C. E. Faxon.

Hemionitis palmata (3410). Tropical forests, Tamasopo, June, 1890.

New or Little-known Plants.

Habenaria carnea.

SOME account of this recent introduction from Singapore was given in our London letter last week, where it was stated that the plant had just flowered at Kew. The illustration on page 487 is from a photograph of this plant. In habit the plant resembles *Habenaria militaris*, but instead of being a bright scarlet like an English soldier's jacket, the flower is a delicate flesh-pink, which fades later on to almost white. The stem rises to a height of six inches and bears some half a dozen flowers which have a spreading lip, a spur often three inches long, and ovate petals and sepals. The leaves are deciduous, and after they fall the plant rests in winter and pushes into growth again in spring. A compost of peat, sphagnum and leaf-mould seems to suit the plant, and it needs abundant heat and moisture. The flowers last nearly a month, and the plant will commend itself to all who are interested in the smaller terrestrial Orchids.

New Orchids.

Physosiphon Guatemalensis, Rolfe, is a small species which appeared with *Odontoglossum grande* in the Glasnevin Botanic Garden, where it flowered in June, 1890, and again during the present year. It is nearly allied to *P. Loddigesii*, Lindl., and has similar deep yellow flowers, but is smaller in all its parts, especially in the much shorter tube of the sepals.—*Kew Bulletin*, 1891, p. 197.

Bulbophyllum denticulatum, Rolfe, is a small species from Sierra Leone which was sent to Kew last May by Mr. James O'Brien, of Harrow. The flowers are about three lines long, and are borne on a somewhat drooping spike. The sepals are pale purple-brown, the petals white, with strong purple mid-nerve and very narrow purple denticulate margin, and the lip orange. The name is given in allusion to the denticulate petals.—*Kew Bulletin*, 1891, p. 197.

Bulbophyllum nigripetalum, Rolfe, is a distinct and remarkable species, with the petals and lip of a uniform purple-black, in allusion to which the name is given. It was introduced from West Africa by Messrs. F. Sander & Co., of St. Albans, and grown by Mr. James O'Brien, with whom it has flowered on two or three occasions. In habit it somewhat resembles the preceding, but has longer racemes, the scapes and ovaries are glaucous green, and the sepals pale yellowish white, with light maroon lines.—*Kew Bulletin*, 1891, p. 197.

Megaclinium Clarkei, Rolfe, is a native of west Africa which flowered in the collection of Major Trevor Clarke, of Daventry, during May of the present year. It is allied to *M. oxypterum*, Lindl., but differs in various details. The flattened rachis, which is the most remarkable feature of the genus, is four lines broad, light green down the centre, with purple-brown spots, almost wholly purple-brown near the margins, and the flowers somewhat similar in color.—*Kew Bulletin*, 1891, p. 198.

Megaclinium leucorachis, Rolfe, is a remarkable species, with the rachis nearly white, quite unlike any other, and, therefore, named in allusion to this character. The flowers are deep yellow. It flowered in the collection of Sir Trevor Lawrence, of Burford Lodge, Dorking, in May, 1890, and, like other species, is probably a native of some part of Africa.—*Kew Bulletin*, 1891, p. 198.

An Orchid Nursery.

THE steadily growing popularity of the large and beautiful Orchid family is one of the features of modern horticulture, and no one who has not actually seen with his own eyes can realize the vast resources of some of the trade establishments devoted to their cultivation. One of the finest of these is that of Messrs. F. Sander & Co., of St. Albans, England, situated within easy distance of the metropolis, yet outside the range of those fogs which have proved so disastrous to the flowers of many fine collections during recent years. Here may be seen between three and four acres of glass devoted almost exclusively to Orchids, for the heating of which four miles of hot-water pipes are required. The houses, which range from 240 to 300 feet long, and are divided into suitable compartments, run at right angles from a long corridor of nearly equal length. They are constructed with special reference to the successful cultivation of Orchids; every point which promises to be of service being carefully considered and carried out substantially but economically, so that they serve as models for those who wish to cultivate these plants successfully. That the various changes introduced have been improvements is evident from the robust health of the plants; dark green leaves and plump, hard pseudo-bulbs being everywhere visible, and giving promise of abundance of flowers at the proper season. Mr. Sander and his manager, Mr. Godseff, seem to have proved by long experience that the most refractory subjects are amenable to cultivation when properly treated, and they lose no opportunity of ascertaining under what conditions the plants grow in a wild state. Many reputedly difficult subjects have been overcome by such intelligent treatment, among which may be specially mentioned *Phajus tuberculosus* and *Vanda Hookeriana*, the stock of each being in excellent condition.

Cool Orchids are here a special feature, and Odontoglossums may be seen in thousands. Between 2,000 and 3,000 plants of *O. grande* are now in the nursery, and a far greater number of *O. crispum*, while other desirable kinds are represented in quantities which make one wonder where they can all possibly go. Last May I here saw 5,000 plants of *Miltonia vexillaria*, and most of them in full flower, and the sight is one not easily to be forgotten. The graceful pendulous racemes of a thousand plants of *Odontoglossum citrosmum* hung from the roof of the long corridor in masses, and served to recall the glowing description given by Roezl, who met with it during his travels in Mexico. "Great was my surprise," he writes, "to see the trees clothed with a profusion of Orchids, which proved to be *O. citrosmum*, whose pendulous spikes, a yard long, were adorned with innumerable white and lilac flowers, which perfumed the air with their delightful fragrance. The stoutest branches of the Oaks were literally loaded, and it was a pleasure to see the profusion of flowers produced by these plants, a single spike bearing upward of thirty expanded flowers. During several days' march we noticed that all the Oak-trees were clothed in this way by this same Orchid, which flowers the more freely when it is exposed to the direct rays of the sun."

A somewhat novel feature in this establishment is that many of the New Granadan Odontoglossums are planted out in prepared beds of fibrous peat, and they evidently like it, for each new pseudo-bulb is much stronger than the preceding one, and on some of the plants being pulled up they presented quite a mass of healthy roots. In this way small pieces are grown into vigorous plants, and many of them are producing strong flower-spikes. Most of the best species and varieties are grown in quantity, at least 75,000 plants being in stock.

Fig. 75.—Hemionitis elegans.—See page 484.

The number of Cattleyas and Lælias in stock is estimated at over 50,000. Cypripediums, Dendrobiums, Vandas, Cœlogynes, Lycastes, Phalænopses, Angræcums, Masdevallias and other popular garden genera are also grown in immense quantities.

At all seasons of the year there is much of interest to be seen here, and a visit during the comparatively dull season of August proved no exception to the rule. Many species and hybrids of Cypripedium were in bloom, including the chaste little *C. niveum*, *C. tonsum*, *C. Parishii*, *C. Curtisii*, also *C.* × *picturatum*, *C.* × *Javanico-superbiens*, *C.* × *Hornianum*, *C.* × *Io*, *C.* × *vexillarium* and many others, some of them in quantity; also *C.* × *Maynardi* and *C.* × *Pollettianum*, two very fine ones raised in the establishment, which have recently received awards at the hands of the Royal Horticultural Society, and which, together with the equally beautiful *C.* × *Castleanum*, are to be figured in an early number of the *Reichenbachia*.

A large batch of *Cattleya Gaskelliana* was finely in bloom, including the chaste variety Albens; also *Cattleya Eldorado*, *C. Dowiana*, *C. velutina*, *C. porphyroglossa*, *C. Schofieldiana*, *Lælia crispa*, *L. monophylla*, *L. elegans* and *L. Schilleriana*, some of them in varieties of great beauty.

A healthy batch of *Vanda Hookeriana*, well known as a difficult subject to cultivate, was observed, some of the plants being in flower. A very interesting sight in one of the houses was a group of the remarkable Swan Orchid (*Cycnoches chlorochilon*), many of the plants being in flower, and among them two females, in which the column is very much shorter and stouter than in the males. It appears that while the latter have been known for so many years, the former have not been observed before the present season.

Several distinct varieties of the beautiful *Odontoglossum Harryanum* were in bloom, but among many of the better-known forms was a plant of the rare natural hybrid, *O.* × *Horsmanni*, a specially interesting subject, whose parents are believed to be *O. Pescatorei* and *O. luteopurpureum*.

Until quite recently the seedling Orchids and some others have been located in a smaller nursery some distance away, but during the present summer new houses have been erected, so as to have the collection all together. Part of the plants had been duly installed at the time of my visit, and in some respects this proved to be the most interesting part of the establishment. Here are hundreds of seedlings of various kinds, some of them from the choicest crosses, from which many novelties may be expected in the future. Some of the crosses pointed out were between distinct genera, and their flowering is awaited with considerable interest. A large stock of patience, however, is required in this work, for it is by no means an unusual circumstance for a seedling Orchid not to reach the flowering stage until it is from five to ten years old, though some arrive earlier at maturity.

Mr. Sander has introduced to cultivation many very valuable Orchids, among which may be mentioned *Maxillaria Sanderiana*, *Odontoglossum Sanderianum*, *Phalænopsis Sanderiana* and *Vanda Sanderiana*, and he has lately re-introduced the genuine autumn-flowering *Cattleya labiata*, so long supposed to be exterminated.

London. *Visitor.*

Cultural Department.

Cabbage and Cauliflower Plants.

PLANTS of Cabbage and Cauliflower intended to be wintered over in frames, from seed sown in September or October, ought to be gotten into their winter quarters by the 1st of November, so as to get fixed and at home before severe weather sets in. The plants should be set quite thickly. We usually put about 800 plants under a three by six-foot sash. The plants should be set, where frosts are severe, so as to cover the entire stem in the soil, or they may be split and made worthless by freezing. After placing them in the frames keep the glass off as much as possible, to harden them. The object is not to make them grow much in the frame, but to keep them in a semi-dormant state, so do not clap on the sash as soon as light freezing occurs. If gradually inured to the air, a temperature during the winter of twenty-five degrees under the glass will not hurt them, but if started into a tender growth by being kept too close they will be injured by the slightest freezing. Cauliflowers are rather more tender than Cabbages, and need closer attention in severe weather.

From Baltimore southward the practice is to set Cabbage-plants in the open ground instead of frames. Ridges running east and west are made with a plow in well-prepared and highly manured land, and the plants are set thickly upon the south side of the base of the ridge, so as to allow for some loss by winter-killing and running to seed, which sometimes happens when the seed is sown too early and too much growth is made before cold weather. The ridges are worked down and the plants cultivated by horse-power in spring. The practice of sowing Cabbage and Cauliflower-seed in fall for wintering over in frames at the north is not now so extensive as formerly, because it has been found that plants from seed sown in hot-beds or greenhouses in February and hardened off in cold frames are better, and but little later, than those wintered over. Even in this latitude, Cabbage-seed sown January 1st in greenhouses and hardened off in cold frames, so as to be set out by the middle of February, will give nearly as early and a much more certain crop than the fall-sown seed.

But for Cauliflower frame-culture here is far the best. For this we set the plants in a three by six-foot sash, for they are to head there, and fill in between them with Lettuce for heading, and later on sow Onion-seed for transplanting. The Cauliflower-plants are kept in a moderately growing state through the winter, and are gradually inured to the air by exposure on all occasions when there is no hard frost, which will here be nearly always in daylight, and by the last of February they are stripped entirely of the sashes, which are transferred to other frames to protect the early Tomato-plants. Plants of a good strain, such as the Snowball or Erfurt, will head very uniformly in March and early in April. The chief danger is in getting them stunted or checked, which causes them to "button" or form little worthless heads in February. The Lettuce will usually be cut out by Christmas, and the Onions transplanted in February.

Raleigh, N. C. *W. F. Massey.*

Roses.

THE extremely hot weather which prevailed during a large part of September has doubtless injured many Roses now in preparation for winter flowering, for the growth made during that period will mostly be thin and weak, and therefore more liable to attacks of disease. The sudden change, too, from very warm to chilly nights and more seasonable weather will be very likely to produce mildew unless strict attention is paid to ventilation and heating, and it is at such a time as this that sulphate of lime proves useful as a mildew remedy. There is not enough heat in the pipes to generate fumes from sulphur sprinkled on them, and dusting the plants all over with sulphur makes them unsightly. Syringing the plants with sulphate of lime in solution, however, leaves but a slight deposit on the foliage and soon stops the spread of the fungus. A good formula for the preparation of this mixture is the following: Slake five pounds of lime in six gallons of water, add five pounds of flour of sulphur, and then reduce the whole by boiling to two gallons. This should be allowed to settle, after which the clear liquid may be bottled off, and thus kept ready for use, in the proportion of one thumb-potful of the liquid to two gallons of water, to be applied with a syringe as the necessity arises. This preparation has a somewhat unpleasant odor, but this remains for a short time only, and as the treatment is more effective when applied late in the afternoon or evening this disadvantage is but slight.

Green-flies will also appear from time to time, and as the Roses will not yet be in flower, unless an early crop is desired, fumigation will be found the cleanest method of disposing of this pest. Later in the season fumigating should be dispensed with, for the blooms of most Roses are easily injured by this process, being either crippled in the bud or having their color bleached out. Among those specially susceptible to injury are Catherine Mermet and The Bride. To overcome this difficulty the evaporation of tobacco-water in vapor-pans placed on the heating-pipes has been tried with excellent results, since the vapor so produced is deadly to the green-fly, and does little, if any, damage to the flowers.

Neat tying and staking adds much to the appearance of a Rose-house. The neatest method undoubtedly is that of stretching wires from end to end of the beds, in line with the plants, to which the plants are tied as their growth demands. This plan does away with stakes, and allows full play for light, air and water among the foliage.

The subject of fertilizers is one that is not easily settled, for much depends on the kind of soil with which the beds have been filled. Where the compost is of a clayey nature it is not well to give a heavy dressing of stable-manure, for in this way the soil may become sodden, while a more concentrated manure may give a much better result. Hen-manure, sheep-manure, bone-dust, wood-ashes and many of the standard manufactured fertilizers are valuable, but their use should be guided by experience, for no hard-and-fast rules can be laid down for the application of special manures.

Some fire-heat will now be required, at least when the thermometer shows much below fifty degrees at night, but the sun being still strong at midday, some care is required in order to prevent the house from becoming too hot at that time, and it is during such weather as may be expected now that some of the advantages of steam-heating become manifest, because this heat can be so readily shut off from the pipes.

Pot-grown Hybrids for early flowering will soon be in condition for starting, since the hot, dry weather of the past month has rather favored the early ripening of the new growth, but it should always be borne in mind that the ripening process may be overdone, for if the wood is allowed to shrivel for want of water there will be little prospect of a satisfactory crop of flowers.

Holmesburg, Pa. *W. H. Taplin.*

Fig. 76.—Habenaria carnea.—See page 484.

Hardy Bulbs.

IF not already in the ground, the bulbs of Tulips and Hyacinths, in the colder states, should be planted as soon as possible, or by the end of October at the latest. Tulips, as seen in our public gardens and parks, are gorgeous while they last, and are eminently suited to such places, and they are often planted largely in private places, and this is the reason that other bulbs have been so long in the background. Tulips are often planted for one season's display only and then thrown away, but it is a very easy matter to plant them somewhat deeper when they can remain in the beds permanently. The bulbs will increase and the quantity of flowers will increase annually if a good top-dressing be given to the bed in the fall, as recommended for the Narcissus. In light soils a depth of six inches is ample for Tulips, but an inch less is better if the soil be of a retentive nature. If it is desired to plant the bulbs in geometrical or other designs the soil must be entirely removed from the beds to the necessary depth, leaving the centre of the bed higher than the margin, just as the surface will be when the bulbs are covered, otherwise the centre bulbs would be covered deeper than the others and they would not flower together. Care must be taken not to tread the soil too hard while planting, or a free root-action will be hindered.

If it is necessary to enrich the soil in the beds it is best done by adding the fertilizers after the bulbs are just covered with soil and before the top-covering of soil is laid on. Most bulbs are very impatient of being brought into direct contact with manure. I always like to place it over them, that the roots may have the nutriment washed down to them by the rains. If there is the least germ present of what is known as the Lily disease, or basal rot, in Narcissus, it seems to me highly important that decaying animal or vegetable matter should not be allowed to come in contact with the bulbs. In cold heavy soil a good sprinkling of sharp grit, or sand, should be placed underneath the bulbs, and the young roots will start out with more vigor and spread rapidly. Bulbs of any description, indeed, cannot be grown in a soil that contains excessive moisture in winter or summer; under-draining is in such a case imperative. Care must be taken that all the manure used is thoroughly decomposed, for in such material as half-decayed stable-manure field-mice are apt to find a happy hunting-

ground, and they are exceedingly fond of Tulips and other choice bulbs.

All these directions apply equally well to Hyacinths also, with the exception that Hyacinths, though they flower for two or three years, are never so good as they are the first season, and cannot be relied upon for permanent planting as Tulips and Narcissus can. It is scarcely necessary here to name varieties, as these are always well described and classed as to season, height and color in all bulb-catalogues, and it would be but a repetition here, but I would like to suggest a trial of the species of Tulips, even if only a few of each be planted. They are quite distinct; many are both curious and beautiful, most of them flower late, and all are worth growing. I refer to such species as *Tulipa Gesneriana, T. Greigii, T. Turkestanica, T. Oculis-solis, T. cornuta, T. lutea, T. Clusiana, T. Florentina*, and a few others. *T. Greigii*, the "Queen of Tulips," is especially beautiful in flower and foliage. The Parrott Tulips, though they are unfitted for in-door culture, are very much admired and useful for cutting. These succeed well in the open ground when the soil is not too rich.

South Lancaster, Mass. *E. O. Orpet.*

Planting Hardy Bulbs.

IT is an error to defer the planting of hardy spring-flowering bulbs until the earth has become lowered in temperature by the wet and cold of the late autumn months. There are cases where the planting of some bulbs cannot be done much before November. Flower-beds on the grass, for instance, often cannot be disturbed before the middle of October, and when Hyacinths, Tulips, and similar things are made use of to embellish them during the spring months, the bulbs can, of course, only be put in the ground when the summer occupants are cleared off. Even at this time, however, there is still some warmth in the ground, much more than a month later, when the soil generally comes down to such a low temperature that bulbs planted then will frequently remain until early spring before making roots. This, I think, must exercise a deteriorating influence on the blooming powers of any bulbous plant that flowers in spring. It is not at all natural for Narcissi, Hyacinths, etc., to pass the winter in a rootless condition, and when they do so they are at the mercy of an inclement winter. Being so hardy, they will not show the effects of cold and wet in such a marked manner as Lilies, for instance, but I am convinced that if a portion of the bulbs are planted at any time during the next six weeks, and the remainder at the beginning of the winter, there will be a sufficiently marked difference in the earliness and quality of the bloom to fully prove the importance of early planting. There is no time so good as the month of September for getting the bulbs in the ground, and I think that this is more especially true of Narcissi; the majority of these begin their season's work in that month, as may be ascertained by taking up a bulb or two.

Some bulbous flowers, such as Crocuses and Tulips, do not apparently suffer by being kept out of the ground during the early autumn months, but I am convinced that Narcissi, more especially those that belong to the Daffodil group, deteriorate more or less if kept out of the soil until winter arrives. Those kinds that love plenty of moisture at the roots when growing appear to feel a lengthened absence from the earth most acutely, and if not planted by the end of October good flowers cannot be reckoned upon. It is the same in pot-culture. Many persons make a point of potting their bulbs at intervals of a fortnight, so as to insure successional bloom, but this is bad practice and unnecessary as regards the result aimed at. It is better to pot them all early, and regulate their blooming season by other means, which can, of course, be easily done, and thus have the advantage of thoroughly well-rooted plants.

Opinions vary as to the depth at which the bulbs should be set in the ground, and no absolute rule can be made in this matter, not even for any one particular kind of bulb. Soils vary infinitely, and when I see the recommendation that Hyacinths should be planted three inches deep, I know that the writer is thinking of those close heavy lands into which warmth penetrates but slowly, and from which superabundant moisture passes away with difficulty. In porous soils Hyacinths may be planted from four to six inches deep, and will be more likely to do well than when set nearer the surface, as they are not likely to suffer so much if the weather is hot and dry at blooming-time. In my light soil I have planted bulbs that had bloomed in pots quite eight inches deep, and they come up and bloom very well every year. Tulips should not be planted quite so deep, but the stronger-habited Daffodils, such as Horsfieldi, Emperor, the common Lent Lily, etc., have always appeared to me to grow much stronger when planted about six inches deep. Where the Lent Lily grows naturally it is seldom found nearer the surface than this. I once had the curiosity in a copse where thousands of this Daffodil were in bloom to see if I could find any bulbs near the surface. With the exception of the very small ones, I failed to find any at a less depth than six inches, which would seem to indicate that in the case of this Daffodil at least there is a tendency on the part of the bulbs to work downward as they get older. I do not see how it can be otherwise, as the seeds, of course, germinate quite near the surface.

It is as difficult to determine the depth at which all the Narcissi should be set in the ground as to decide what kind of soil and position best suits each particular kind. I am convinced that the more delicate kinds dislike to be deeply buried in the ground. It is courting certain failure to plant such kinds as Cernuus, Moschatus, Mary Anderson, Leda and others in heavy land at the same depth as the gross-growing Sir Watkin or Emperor, and even in light soils I find they do better when not more than three inches of earth covers the bulbs. In their case success or failure may entirely depend on the influence that the sun's rays exercise on the bulbs both when in growth and during the resting period. The Lent Lily, the old double Daffodil, the Tenby, and a few others will thrive in positions where the bulbs are screened from the sun when at rest, but under such conditions kinds of a less robust nature will die out. A certain amount of the ripening process that is indispensable for many bulbous flowers would appear in their case to be necessary. In retentive soils they cannot feel the influence of the sun's heat to an appreciable extent, unless the bulbs are set within two or three inches of the surface. I have had no experience of basal rot in Daffodils, and with some kinds and in certain soils it may not be possible to absolutely guarantee every bulb from its attacks, but it is reasonable to suppose that an immature condition of the bulbs will favor its development, and more especially if they are encased in a mass of sodden soil during the winter months. In an interesting note on this subject in a recent issue of *The Garden*, a correspondent observes, "I have no doubt that the failure of these bulbs is to be attributed to the want of sun and undue moisture," and I would, therefore, recommend a trial of shallow planting in the case of kinds that are liable to this disease. —*J. C. B., in The Garden, London.*

The Hardy Plant Garden.

AT every season there are hardy plants which are pre-eminent, and in the late fall no other, at least among the tall-growing kinds, are as attractive and useful as the Japanese Anemones, furnishing as they do an abundance of handsome flowers just before the glory of the Chrysanthemums begins. Other flowers there are, of course, in various stages of perfection. The hardy Gaillardias, as for months past, are still in profuse bloom, their large flowers showy but somewhat coarse. A few perennial Asters still linger, *Anthemis tinctoria* displays a profusion of its yellow stars, *Campanula lactiflora* and *C. rotundifolia* are still covered with flowers; *Plumbago Larpentæ* will only cease to unfold its pure blue flowers when frozen; *Achillea rosea* and *A. ptarmica*, Tricyrtis, a few Phloxes and Epilobiums give stray bits of color, with no signs of suffering as yet from autumnal winds. But among them all the Japanese Anemones stand in queenly grace, though not at their best this year, owing to the dry season, for they require a somewhat moist location.

If one had the room a very pleasing effect could be made with a bed of Japanese Anemones, with, perhaps, the blue flowering Autumn Monkshood (*Aconitum autumnale*) as a foil, bordered with broad masses of Autumn Colchicums and Crocuses. With fair weather such a bed would prove bright and attractive in the "melancholy days" of the year. Ah! that weather—a subject never worn to the grower of hardy plants, which disarranges our best-laid plans and handicaps us in every cultural struggle. When the Government's rain-makers return to observation perhaps they may have so mastered the elements that we may have climates turned on to suit, and in those happy days advice as to cultural details may be of some value. At present out-of-door gardening is a hit-or-miss affair at best, and one does what experience teaches is the best average practice, with sometimes queer results. For several years my Chrysanthemums were nearly drowned out, as they were planted on the level, and this led me to plant them in raised beds. Since adapting this practice we have not had enough rain during the growing season to keep them in good health. If I have advised any one heretofore to grow

Chrysanthemums in raised beds I hereby withdraw that counsel.

This year we have had two very dry periods in this section, the present one and one in the spring, just at the time when we were trying to establish small plants. A pretty bad failure at this critical period with some Mossy Saxifrages leads me to note a device which I noticed too late to try, but which would probably be a happy expedient in a dry season with plants which require a fair supply of moisture. It consists in placing near the plant a water-tight pot, to be filled with water. Loose strands of cotton lead the water by capillary attraction in a gentle flow to the plant and keep up the moisture necessary to its growth in a dry season. This is commended on grounds of expediency rather than of æsthetic principles. But there are occasions in the hardy garden when ideas of beauty must give way to those of utility. Here is the question of labels, for instance, which at this season are apt to be especially prominent. Not every hardy garden is necessarily a "collection of labels with plants behind them," but where many varieties of plants are grown and carefully marked the garden is apt to take on the appearance of a miniature cemetery, and quite unavoidably. There are labels and labels, and which is the best one is yet an unsolved problem; the fact being that there is no one best for every purpose. The worst is probably the wooden one of the dealers, cheaply made of a soft sappy wood, which will scarcely last through the season. Probably the best label for new plants, or those one wishes to keep in prominence, is a cedar label, made of sufficient length to hold well in the ground during a thaw. If it is painted, so much the better. The name should be written firmly with a soft pencil, and will be legible for several years if well done. Where plants are more familiar, or one seldom has to refer to the name, a thin copper tag, fastened to a brass wire a foot long, is an inconspicuous and useful label. The wire is easily thrust into the earth and holds the tag securely near the ground, where it is readily found when wanted. With a smooth point one can write on the tag placed on a yielding substance, and the writing cannot be effaced. Tags without the wires may be bought or may be easily and cheaply made by any one, the sheet copper being sold by hardware dealers.

There are people who love flowers and garden without labels, but without any disrespect to a deserving portion of the community, I make bold to say that among these are a great number who know a number of things that are not true. The label habit tends to accuracy, and in the end it will add to the interest of any garden.

Elizabeth, N. J. *J. N. Gerard.*

Correspondence.

A Fairy Candelabrum.

To the Editor of Garden and Forest:

Sir,—This is the season when it is interesting to study the various means adopted by nature for disseminating seed. One need not be a botanist to notice the difference in form and the delicate beauty of many of these waifs of the wind, usually unheeded and unnoticed because of their very profusion.

Especially charming and attractive, as its seeds mature and flit away, is the Fireweed, *Erechtites hieracifolia*. A little while since it was a rank and coarse herb, with flowers of dull white, that we passed without bestowing on it a second thought. Now, the flowers having withered and vanished, we are attracted by the tall plant, untouched by frost, that raises on finely grooved stems countless exquisitely shaped green urns, with delicate-hued tops, soft as the downiest velvet.

Let us take home a branch to watch at our leisure its further development. We put it in a glass of water, set it in a sunny spot and place a glass globe over it, for, as the pappus expands, just as the lights of a candelabrum are kindled one by one, the slightest current of air would send the fleecy seeds fluttering in every direction, and the beauty and symmetry of the dainty white spheres would soon be destroyed.

We notice first a slit down one side of the green involucre; presently it grows wider, and one after another of the fairy-like company confined within presses out of the narrow aperture to get a glimpse of the world. One green scale after another is forced out and back, till they are all wholly concealed and lost to view in the perfect downy sphere of snowy white that stands where the green urn stood an hour ago. Another urn, and another, changes in the same way before our eyes in the next hour, and our candelabrum begins to put on a festive appearance. The illumination goes on regularly and symmetrically too, the first globe of glistening white appearing at the summit, then others at regular intervals around and below, each being the terminal head of a side branch.

If called away for an hour or two we find on returning a marvelous change, more than half, perhaps, of the candelabrum being lighted up. It may be a day or two before the smaller and least-developed heads will fully mature. Meanwhile those that opened first will begin to fall. With fairy-like grace each fleecy tuft slowly settles to its place, as if half-inclined to soar aloft instead of being drawn downward by the tiny brown kernel with which it is weighted. How lightly they lie heaped one above another, and how rapidly does the heap get higher and higher! How fastidiously do the later comers roll slowly along over the feathery mound, till they find just the right spot in which to rest! This miniature snow-storm within doors is lovely and fascinating beyond description, and sometimes it will go on slowly and unceasingly for several days or a week. Sometimes, on the other hand, the heads will develop more rapidly, and the seeds will all have fallen by the second or third day.

The globe to keep the flying pappus within bounds is not absolutely necessary. If the vase be placed on a tray in a retired nook, where no current of air can come, most of the pappus will fall on the tray.

When the last white pappus has fallen down, and we tire of the beauty of the airy heap that lies high-piled and motionless, we can open the window and lift the globe, and the gossamer stars at the first breath of wind will float away, glittering in the sunshine.

Gloucester, Mass. *Sarah G. Duley.*

Recent Publications.

THE ordinary varieties of the garden Cucumber, particularly the White Spine, are sometimes grown in this country for winter use, but the so-called English varieties, which are altogether superior for forcing, are practically unknown, except to a few persons who grow them for the large cities. We are, therefore, gratified to find a late bulletin of the Cornell Experiment Station devoted to the forcing of the English Cucumber, which represents the highest type of this vegetable, and which is so distinct in appearance from our own kinds that novices often fail to recognize some of its forms as Cucumbers. Sion House is the variety which Professor Bailey grows most largely. It is of medium size, being from a foot to fourteen inches long at maturity and smooth and regular. Another favorite variety is Telegraph, which is slender and handsome, ordinarily reaching a length of eighteen or twenty inches. Kenyon is another slender variety of somewhat medium length. Edinburgh is a spiny and somewhat furrowed variety, and, therefore, not attractive, although it reaches a length of two feet. Lorne is the best of the large sorts, perfect specimens of the fruit sometimes measuring nearly three feet. Some of the very longest ones are too large for convenient table use and are sometimes inferior in quality to those a foot in length, although, when grown rapidly, the largest specimens are often excellent. The flavor of English Cucumbers differs somewhat from our own field sorts, and their texture is less brittle. They retain their green color longer than the field varieties, and are ordinarily picked before they attain their full growth, although they remain edible for some time after they have reached maturity.

In cultivation, the general requirements in regard to light, temperature and moisture are the same as that for forcing Tomatoes and Beans. They need a light warm house and facilities for brisk bottom-heat. At night a temperature of from sixty to sixty-five degrees is preferable, and seventy degrees to seventy-five degrees during the day, although the temperature will sometimes run up to eighty-five or ninety degrees when in the full sun and with open ventilators. Cucumbers are vigorous feeders and need an abundant water-supply to keep them from flagging, and in bright weather the air should be kept moist by wetting down the walks, to encourage growth and discourage the red spider. In preparing the beds, which are eight inches deep, an inch of clinkers and potsherds are placed on the boards, then three or four inches of partially decayed sods from an old pasture, the remainder being rich garden-soil, to which one-quarter of its bulk in well-rotted manure has been added. It is imperative that the soil be rich, because the productiveness of the Cucumber is almost entirely a question of food. If, however, the soil is somewhat sticky some sand should be added to increase its porosity.

The plants are started in three-inch pots filled one-third full of earth, and when a pair of true leaves is formed

above the rim the pot is filled, which gives more root-space and saves transplanting. When these pots are filled with roots the plants are set in the beds, and then follows the critical time in Cucumber-forcing. The young plants are subject to attacks of aphis and fungi, and any failure in bottom-heat will check them. Few vegetables require such careful attention until they are well established. The aphis must be kept off, or the plants will be ruined in a few days. If the plant is once stunted it will make a short bunchy growth at the top and the leaves will be small and yellow, and it may remain stationary for weeks, and even if it finally resumes growth it rarely becomes a profitable plant. To ensure a good stand three or four times as many plants as are needed should be started with the most vigorous ones set out a foot or a foot and a half apart. When they are established the weaker ones are destroyed, leaving the remaining individuals from two and a half to three feet apart. So long as the growing portions of the plant are vigorous, and the leaves are not mildewed, the plant may be considered in good condition, although the lower leaves fall off, giving it a scraggy appearance.

When there is room above the benches the plants are trained upon a perpendicular trellis of annealed wire, but on low benches they are trained along the roof. The vines are tied upon the wires with raffia or soft cord; two or three strong main branches are trained out and only enough side shoots are allowed to grow to cover the trellis, the remaining ones being pinched out as soon as they appear. The plants should not be overcrowded with young growth, and some of the large leaves may be taken off in the dark days of midwinter if the foliage is dense. The branches are all headed in as soon as they reach the top of the trellis or encroach upon the space allowed for neighboring plants. The two chief causes of failure are, insufficient bottom-heat and impatience for quicker results. Earliness is not a characteristic of the English Cucumber; from eighty to a hundred days elapse after the sowing of seed before the fruit is fit for the table, and from a month to six weeks is needed for the fruit to attain salable size after the flower has set. The plants continue to bear from three to four months under the best treatment, and each plant ought to yield at least eight good fruits. If they are pinched in, after the English custom, and allowed to bear but two or three fruits, the season can be extended, but it is probably more profitable to secure returns more quickly. The heavy fruits should not be allowed to pull the vines from their support, and those which do not hang free should be held up in slings, for if allowed to lie on the soil they do not color evenly.

Cucumbers are monœcious—that is, the sexes are in separate flowers on the same plant. The staminate flowers are the more numerous, and they begin to appear earlier, so that a sufficient supply of pollen is assured. Out-of-doors the pollen is carried to the pistillate flowers by insects, but these are absent from the greenhouse, and if the flowers are fertilized the pollen must be carried by hand. There is a question, however, whether pollination is advisable in the house, for it is certain that the English Cucumber will grow to perfection without the aid of pollen and without seeds. Many gardeners suppose that pollen causes the fruit to grow large and lumpy at the blossom end, where alone the seed forms, and they, therefore, aim to produce seedless Cucumbers in order to procure straighter and more shapely fruits. Professor Bailey is not able to make definite statements on these questions, although he has experimented on them for two winters. In his experience it has paid to pollinate by hand if early fruits are desired. The early flowers nearly always fail to set freely with no pollen. The method of pollination is to pick a staminate flower, strip off the corolla and insert the column of anthers into the pistillate flowers. Fruits which have set without pollination are uniformly seedless throughout, the walls of the ovules remaining loose and empty. To prevent misshapen fruits English gardeners often grow them in glass tubes, but the swollen end is not always caused by seed-bearing, and pollination on one side does not destroy the symmetry of the fruit as it does in tomatoes, for example. There appears to be a peculiarity in individual plants in this respect, and upon some individuals, where the fruits were liable to enlargement at the end, it was found that the fruits would grow to uniform thickness if they were hung up in slings.

English forcing Cucumbers cannot be grown in the fields successfully, but their smoothness and regularity, with length and vigor of vine, are good qualities, and therefore attempts were made at Cornell to cross the Sion House with the Medium Green in hopes of producing a superior sort for out-door use. The results have been interesting from a scientific point of view, but the desired variety has not yet been procured. Fruits of promise have been obtained, but they have not produced good seeds. Some of the mongrel fruits developed a tendency of the cell-walls to decay; the seeds did not mature and the pulp-tissue about them solidified. Near the apex of the fruit the placentæ tended to break away from the pod, and in the cavities decay set in, extending to the base of the fruit. All the fruits on one of the plants behaved in this manner, and in no case was the decay visible on the exterior until it extended well down the fruit. In most instances the mongrel vines resembled Medium Green, the staminate parent, more than Sion House. The fruits were generally intermediate through almost every gradation. Some of the vines bore beautiful fruits, twice as long as the Medium Green, nearly cylindrical and almost spineless, and good things are hoped from this cross.

The spotted mite, which feeds upon the under surface of the leaves, is the most serious enemy to Cucumbers under glass. It can be kept in check by using half a pint of Hughes' Fir-tree oil to two gallons of water and applied in spray. A large black aphis has been a serious pest, but this can also be destroyed with the Fir-tree oil. The powdery mildew will ruin the plants if it once gains a foothold, but this can be held in check by flowers of sulphur placed in a basin and set on an oil-stove in the greenhouse. The house is tightly closed and enough sulphur is evaporated to fill the house with strong fumes for half an hour, care being taken that the sulphur does not burn.

To the student in plant-variation these forcing Cucumbers possess great interest. They are quite distinct from all others, and yet they are known to have come in recent times from the shorter and spiny field sorts. The earliest mention made of the long-forcing Cucumber is in the *Transactions of the London Horticultural Society* in 1822, where it is stated that Patrick Flanagan, gardener to Sir Thomas Hare, sent two specimens of cucumbers to the Horticultural Society, one of which was seventeen inches in length and weighed twenty-six ounces. Mr. Flanagan states that he has frequently grown these cucumbers nearly two feet long, and yet in high perfection for the table. Seeds were given to the society, and were distributed under the name of Flanagan's Cucumber. The surprise which these fruits occasioned among a body of gardeners indicates that they were novelties. The oldest variety which is now grown appears to be Sion House, which was known sixty years ago. From this comparatively recent beginning the English Cucumbers have diverged from their parentage and differ from the common varieties in being very long and slender, cylindrical and not furrowed, spineless, or nearly so, at maturity, remaining green until ripe, and producing seeds sparingly. The flowers are very large and vigorous, the tendrils thick, the leaves broad in proportion to their length, and the full-grown ones have a tendency to make shallower sinuses than the field kind. The most remarkable peculiarity, however, is their habit of producing seedless fruits, which has already been spoken of.

Periodical Literature.

Mr. T. S. Brandegee contributes to the July issue of *Zoë*, which has only just reached us, an interesting paper on "The Vegetation of Burns," that is, the ground over which forest-fires have run. The open forests of Colorado and Montana are composed of *Pinus ponderosa*, mixed here and there with the Douglas Fir, and are often injured by fires which run through them and which burn the grass, the underbrush, and all fallen dead limbs and trunks, but without doing much injury to the trees themselves, except the young ones which are only protected with thin bark. The Douglas Fir, the Yellow Pine and a few other trees, Mr. Brandegee tells us, stand without injury a fire hot enough to blacken their trunks, while the Hemlocks and Spruces are killed by a very slight fire about the base of their stems. The inability of these last to withstand heat arises from the fact that their bark is much thinner than that of the Douglas Fir, the Yellow Pine or the Sequoia. The trees, in all of these interior forests killed by fire, become dry, and afford abundant material for more serious fires in succeeding years, and these subsequent fires being once started usually destroy everything that escapes the first burn.

The Redwood-trees of the forests of the California coast, when they are killed or burned to the ground, send up many new shoots from their roots, which soon surround the old stems with a luxuriant growth, from the midst of which the parent stem in time disappears, leaving only the circular groves characteristic of the Redwood. The forests of Douglas Fir in the coast region of Oregon and Washington destroyed by fire are in time replaced by

countless seedlings, which grow very rapidly, but in the interior the dry climate, the browsing of cattle and sheep, and the sensitiveness of the young trees to fire generally prevent the restoration of original forest-growth. In the high mountainous regions of these forests there is much Hemlock or Spruce and small trees of Douglas Fir, which are easily killed by the fires, which readily mount the steep slopes. This mountainous region, except where the soil deprived of the protection afforded by vegetation may have been washed away by rains, is more commonly covered with a new tree-growth than regions of a lesser altitude, although the new growth is not always at first the same as that of the original forest. Fire is very apt to destroy in the mountain regions the seeds of conifers, for seedlings do not appear immediately on the site of a coniferous forest, although trees of the original species gradually appear growing under the shade and protection of bushes, Aspens and other plants which first cover the burnt ground. That fire is the principal cause of this change of forest-composition is shown by the fact that when the original trees are cut and fires are excluded, young trees of the same species appear at once.

Mr. Brandegee notices that many of the trees which grow in these regions where fires prevail, and doubtless have always prevailed to a greater or to a less extent, have the power of reproducing themselves by root-suckers strongly developed. The Redwood is a conspicuous instance. The Nutmeg Hickory (*Torreya Californica*), another conifer, does the same thing, and so do the Manzanitas, the Huckleberries and the Madroña. The California Oaks, the Chinquapin (*Castanopsis chrysophylla*), the Hazel, and *Heteromelis arbutifolia*, a beautiful California tree of the Rose family, all renew themselves in the same manner, and almost all woody plants seem to reappear from their blackened roots.

The soil loosened by fire and enriched by the ashes of the destroyed forests provides excellent seed-beds for the germination of the seeds of many annual and perennial plants, and these California burns often offer the very best botanizing ground in the state; and several otherwise rather local plants are now appearing in such situations in much greater numbers and growing much more luxuriously than they have ever been known to before. Mr. Brandegee notices, as has already been done before in San Diego County, that the California Poppy (*Papaver Californicum*), such a very rare plant that it was never discovered until a few years ago on the Santa Inez Mountains, near Santa Barbara, is now growing abundantly on burns in two or three localities near San Francisco. *Calandrinia Breweri*, a rare plant from the southern part of the state, has made its appearance on Balinas Ridge and on the sides of the new trails of Mount Tamalpais this year, apparently for the first time, "magnificent plants appearing and spreading over the ground, forming mats three feet in diameter." *Silene multinervia*, a plant especially abundant on Santa Cruz Island and in a few places in the southern part of the state, has also appeared this year upon the Balinas burn on the southern slopes of Mount Tamalpais. It is not difficult, therefore, to imagine how great an influence this periodical burning of vast areas must have upon the composition and spread of the flora of the region, and such observations as these which Mr. Brandegee here records will some time or other be of very considerable historical value as bearing upon the distribution of California plants.

Pomology.

Meeting of the American Pomological Society.—III.

WE conclude our report of the meeting of the American Pomological Society with a few more extracts, necessarily brief, from the addresses delivered. Many interesting papers we must pass, for the present, without mention, and we may add that there were several important essays prepared for the meeting which were not read for want of time. Perhaps they could have been heard if the addresses which were delivered had been properly condensed, or if only such portions of them as were interesting to the audience and likely to be discussed had been read. It was suggested that hereafter some preliminary examination of essays should be made by the secretary and only such received as had substantial and permanent value.

The Wilder medals for displays of fruits were awarded as follows: to the Virginia State Board of Agriculture, represented by Henry L. Lyman, for 451 plates of different varieties; to P. J. Berckmans, of Augusta, for eight varieties of Japanese Persimmons, one plate of *Limonium trifoliatum*, two plates of Kieffer Pears; to Rev. Lyman Phelps, of Sanford, Florida, for Limes, Japanese Persimmons and a collection of Citrus hybrids and crosses; to Ellwanger & Barry for 112 varieties of Pears. The bronze medals were awarded as follows: to Charles H. Hedges, Charlotteville, Virginia, for Grapes; Luther Burbank, Santa Rosa, California, for seedling Quinces; J. T. Harris, of La Crescent, Minnesota, for Apples; Wisconsin Horticultural Society for Apples; The Jewell Nursery Company, of Lake City, Minnesota, for Seedling Apples; P. S. Dinsmore, of Riverside, California, for Apples; J. W. Porter, of Piedmont, Virginia, for Apples; and J. L. Babcock, of Virginia, for Apples.

SOME LOCAL PROBLEMS IN POMOLOGY.

Mr. Charles W. Garfield, of Grand Rapids, Michigan, delivered an address on this subject, in which he attempted to show that success in fruit-growing could only be accomplished by a careful study of the particular conditions of given localities, and that a large proportion of the failures in this business was due to the selections of varieties which were valuable elsewhere, but not suited to the particular spot in which they were planted, and to methods of cultivation which, although they might be the best practice in other parts of the country, were not adapted to local conditions. He concluded his address as follows:

I would not depreciate the value of our national gatherings in the interest of pomology, but the man who goes a long way from home to get advice as to what varieties to plant or how to manage them, is liable to be misled. His local conditions are the ones to be studied, and hence the great importance of carefully conducted experiments in our own neighborhood. All honor to the men who are willing to be pointed at as theorists, experimenters, book-farmers, etc., whose trials are but a few of them crowned with success, but whose failures are a perpetual help to their neighbors. General habits of thrift and scientific method are of the widest application, but the dealing with an individual's environment, so as to make the best possible use of his opportunities, is a problem which each one must largely work out for himself. He can only learn of his nearest neighbors, and he is greatly blest if these neighbors are broad-minded, careful people, given more to patient investigation than the elaboration of theories.

We think a great many things, in relation to fruit-growing, and often think aloud too quickly. We know very little, and even this grows less when we attempt to give it wide application. I have listened so often to discussions in which the relation of experience has taken a prominent part, and have noted so many false inferences that have brought disaster to those who attempted to utilize them, that possibly I may magnify the importance of varying local conditions, as affecting experience and counsel.

Of course, a successful fruit-grower must be well grounded in general principles in order to most quickly lay hold of his local conditions and manipulate them in his interests; but, after all, it is of the highest importance that people in a neighborhood, and all having similar conditions, should familiarly compare observations and experience, so there will be brought out a body of local doctrine—a consensus of opinion which can be known and utilized. It is uphill work trying to induce people to have more confidence in the counsel of their neighbors than in that of strangers, and often, when asked for advice by one far away, when I have referred the interrogation to the man's own neighbors, I have knocked a foundation-stone from under my fame. Still, I insist that the most serious problems we have to solve in growing fruit are those which are peculiar to our own localities, and these we must solve for ourselves. At all events, we cannot safely rely upon the counsel of strangers for their solution.

The Rev. Lyman Phelps, of Sanford, Florida, delivered an address to show that cross-fertilization affects immediately the quality and commercial value of citrus fruits. Mr. Phelps exhibited a great many oranges which were abnormal in form and in which the character of the skin and color of the pulp had been changed, and these variations were attributed to the fact that the blossoms had been fertilized by pollen from trees which bore fruit differing in size and form and texture. Mr. Lyman was so thoroughly convinced of the immediate influence of pollen that he declared that he had lost $1,500 in a single year from fruit which had been rendered defective by foreign pollen.

Dr. Erwin F. Smith, of the Department of Agriculture, delivered an address on the "Chemistry of the Peach Yellows,"

in which he explained the method of study he had practiced for four years in the investigation of the peach yellows. The rather disheartening conclusions were reached that the cause of the disease yet remains a mystery, that it is transmissible, that so far no remedy has been found for it, and the axe and fire is the only treatment that promises any relief from its ravages. Nevertheless, Dr. Smith's address was most instructive as an example of genuine scientific investigation, in which nothing is taken for granted, and every point is subjected to the crucial test of experiment, and it may be added that even the negative results obtained are of great value since they narrow down to definite limits the field in which further researches are to be made.

Mr. H. S. Williams, of Rockledge, Florida, a well-known grower of Oranges on the Indian River, read an essay to show how thoroughly adapted the mountain region of western North Carolina is to general fruit-culture. A few years ago he passed some time near the village of Bavard, in Transylvania County, which is between 2,500 and 3,000 feet above sea-level. He noticed that the Apple-trees which had been planted there, although very old, were still bearing well. Unpruned Peach-trees, some of them twenty-six inches in diameter, bore abundantly on the younger wood, and indicated that this region was exceptionally favorable for the growth of this fruit. A small vineyard on the French Broad River, with ground covered with weeds and vines never trimmed, showed a remarkable display of fruit. He therefore set out a small orchard with Peach and Apple-trees of choice varieties, and a few hundred Grape-vines, and passing through the property on his way to the meeting, he found the vines full of fruit and promising well. The Peaches were exceptionally fine, and some of the seedling Apples which he exhibited, and which had grown on the old trees after having been trimmed and cared for, were remarkably beautiful. Mr. Williams concluded that these mountain valleys of western Virginia would be found equal to any other part of the country for fruit-growing.

Notes.

Several leading growers of flowering plants in Europe have already offered to send large collections to the Columbian Fair, and Mr. Thorpe expects to have an extraordinary collection of Orchids ready for the opening of the Exposition.

The publishers of *Popular Gardening* announce that that periodical is hereafter to be merged into the *American Garden*. Mr. Long, of the first-named paper, will remain in Buffalo and continue to edit the new magazine, whose name is not announced, and the business will be conducted by the Rural Publishing Company, of this city.

An experienced grape-grower recently stated that when vines are forced into luxuriant growth the pruning should not be as close as when only moderate growth is made. In the latter case the best bearing buds are nearest the base of the cane, while in canes that have grown more vigorously the strongest buds are further away, and therefore are lost when the vine is pruned closely.

It is reported by Consul M'Lain, of Nassau, New Providence, that a machine has recently been invented by an American which will separate automatically the Sisal hemp fibre from the leaves, with ease, at the rate of 180 pounds of fibre in a day. This will remove one of the great obstacles to the profitable cultivation of the Agave, which yields this fibre in Texas, Florida, and perhaps in other portions of the United States.

Professor Georgeson calls attention to the fact that in Japan there are numerous dwarf varieties of Pines, Firs, Cypresses, Arbor-vitæs and other conifers, which are very distinct, and which differ much in habit of growth, the length of their leaves and their general appearance. The ordinary species are well known here, but these varieties are not well known, and no doubt many of them would prove a substantial addition to our garden trees and shrubs.

Mr. Meehan, in the monthly which bears his name, repeats his opinion that the disease known as Peach Yellows is caused by the attack of a Mushroom (*Agaricus melleus*) on the roots of the tree. Dr. Erwin Smith seems to have demonstrated that the disease can be transmitted by inoculation of the limbs of a healthy tree with the sap of a diseased one. It would be interesting to know how any vegetative portion of the fungus is conveyed in inoculation of this kind.

Mr. Robert Craig writes to the *American Florist* that he regards Marie Guillot as the best out-door Rose, and almost unrivaled as a pot-plant, and he also considers Papa Gontier as an excellent bedding Rose and the best red Tea Rose for out-door planting. Mr. Craig, in the same paper, states that young Palms when planted on benches from thumb-pots grow as fast again as when kept steadily in pots. When they are large enough to be placed in five-inch pots they do not suffer in the least from lifting.

Mr. Joseph A. Burton, of Mitchell, Indiana, considers mulching better treatment for his orchard than plowing, which is, after all, little more than mulching with surface soil. Under bearing trees it is difficult to plow, and roots are, to a certain extent, mangled; besides this, orchards on hill-sides after they are plowed are liable to be furrowed into deep gullies by heavy rains. Any waste material will do for a mulch, whether it is straw, sawdust, shavings, weeds, briers or rotten wood. Mr. Burton sows his ground to Clover and mows it, allowing it to remain on the ground as mulch, and when it rots it furnishes a valuable fertilizer.

The death is announced, in his sixty-second year, of Jean Baptiste Joseph van Vloxem, one of the most accomplished dendrologists in Europe, whose beautiful gardens and park, where he had formed an extensive arboretum and where many large specimens of American trees were to be seen, were one of the most interesting spots to visit in the neighborhood of Brussels. Monsieur Van Vloxem traveled extensively some years ago in this country, as well as in Japan, in some parts of Columbia and in the Caucasus. It was by him that the now well-known *Tacsonia Vloxemi* was introduced from South America, and it was to him also that we owe the introduction of the beautiful Caucasian Maple which bears his name.

A writer in the *Gardeners' Magazine*, London, speaks of the facility which the Douglas Spruce manifests for accommodating itself to various soils in Great Britain. Some of the best specimens of the tree are found in rich loam or alluvium and in sheltered situations. At Eastnor Castle it drives its roots down through the fissures of the rocks, which are just below the surface soil, and flourishes well on the moisture there found for its support. It grows with great vigor among the slate rocks of North Wales, even up to the very summits of the hills, and seems well adapted to elevated situations where even Spruce will not grow. In favored situations its growth is very rapid in Great Britain, and trees planted only thirty years have in that time reached a height of seventy feet, with a proportionate bulk of stem.

Mr. Albert Benz, in a late circular, divides Garden Pansies into six classes, according to the manner in which they are colored. The first class comprises self-colored flowers—that is, those which have an even shade spread over the whole surface of each of the petals. They may be white, yellow, bronze, mohogany, brown, purple, lavender, violet and nearly all intermediate shades. They can be depended on more largely than the other varieties to come true from seed. Shaded Pansies constitute the second class, in which the flowers have the darkest shade of a given color at the upper end of the upper petals gradually graded down to a lighter shade toward the bottom end of the lower petal. Others of this class are darkest in the centre and shade gradually into a lighter tint toward the edge of all the petals. The Three-spotted or Face Pansies include the flowers which show a distinct mask, or face, in their centre—that is, a dark spot on each side of the side petals, and a broad and larger one on the lower petal. This includes most of the English Pansies and the new French Trimardeau, a remarkable sort for the size of its flowers, which are, however, somewhat deficient in substance and richness of color. The Odier or Five-spotted, Pansies have a white, yellow, blue, crimson, or brown color and a large dark spot on each one of the five petals. To be perfect, these spots, starting from the centre of the flower, should cover two-thirds or three-fourths of its surface, and be of equal dimensions on each petal with a well-defined outline. Cassier and Bougnot have succeeded in improving this class materially in size of flowers and growth of foliage. Edged or Border Pansies have flowers with a narrow, but distinct, edging around the outside of each petal of a color which contrasts well with the ground-color of the flower. The color of the border is generally white or gold when on blue, purple or bronze flowers, and blue or pinkish on white and yellow flowers. The sixth and last class, called Fancy Pansies, have the marble-striped and flaked flowers, which are distinguished by great oddity and beauty in their coloring and marking.

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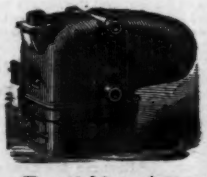

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